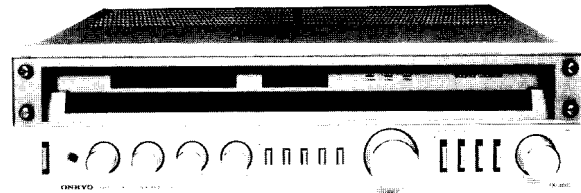


# ONKYO SERVICE MANUAL

## SERVO LOCKED FM/AM STEREO RECEIVER MODEL TX-3000



D model



G/W model

**SPECIFICATIONS**  
**AMPLIFIER SECTION**

Output Power:	45 watts per channel, min. RMS, at 8 ohms both channels driven, from 20 Hz to 20,000 Hz, with no more than 0.04% total harmonic distortion.
Total Harmonic Distortion:	0.04% at rated power 0.04% at 1 watt output
IM Distortion:	0.1% at rated power 0.04% at 1 watt output
Damping Factor:	40 at 8 ohms
Frequency Response:	20 Hz – 30,000 Hz ( $\pm 1$ dB)
RIAA Deviation:	20 Hz – 20,000 Hz ( $\pm 0.8$ dB)
Sensitivity & Impedance:	Phono: 2.5 mV, 50 kohms Tape Play: 150 mV, 50 kohms Tape Rec: 150 mV, 3.5 kohms (PH)
Phono Overload:	180 mV r.m.s. at 1 kHz, 0.04% T.H.D.
Signal-to-Noise Ratio:	Phono: 85 dB (at 10 mV input IHF A weighted) 65 dB (IHF C weighted) Tape: 95 dB (IHF A weighted) 90 dB (IHF C weighted)
Residual Hum & Noise:	0.8 mV at Volume Control: min.
Tone Controls:	Bass: $\pm 12$ dB at 100 Hz Treble: $\pm 12$ dB at 10 kHz
High Filter:	6 kHz (6 dB/oct)
Loudness (–30 dB):	+9 dB at 40 Hz +5 dB at 20 kHz

**TUNER SECTION**

<b>FM:</b>	
Tuning Range:	88 – 108 MHz (D model) 87.5 MHz – 108 MHz (G/W model)
Usable Sensitivity:	Mono: 11.2 dBf, 2 $\mu$ V Stereo: 19.2 dBf, 5 $\mu$ V
50 dB Quieting Sensitivity:	Mono: 17.2 dBf, 4 $\mu$ V Stereo: 37.2 dBf, 40 $\mu$ V
Capture Ratio:	1.5 dB
Image Rejection Ratio:	60 dB
IF Rejection Ratio:	85 dB
Spurious Rejection Ratio:	85 dB

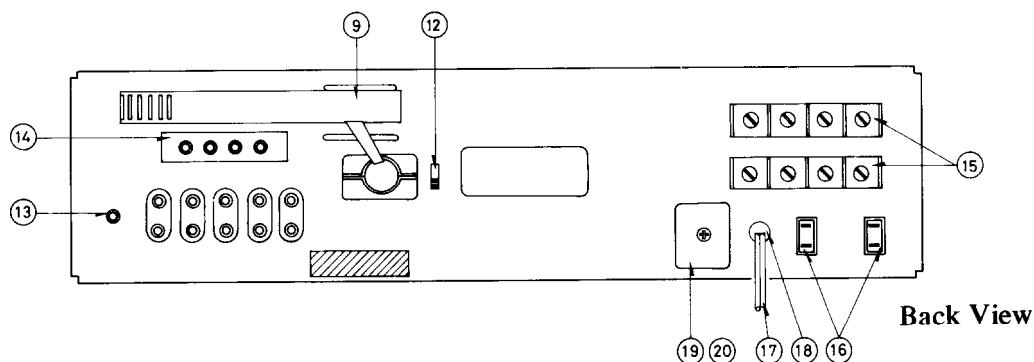
Signal-to-Noise Ratio:	Mono: 70 dB Stereo: 65 dB
Alternate Channel Att:	60 dB
AM Suppression Ratio:	52 dB
Harmonic Distortion:	Mono: 0.15% Stereo: 0.3%
Frequency Response:	30 Hz – 15,000 Hz ( $\pm 1.5$ dB)
Stereo Separation:	40 dB at 1 kHz 30 dB at 100 Hz – 10,000 Hz
Muting Level:	14.7 dBf, 3 $\mu$ V
Stereo Threshold:	14.7 dBf, 3 $\mu$ V
Servo Lock Level:	14.7 dBf, 3 $\mu$ V
<b>AM:</b>	
Tuning Range:	525 – 1,620 kHz
Usable Sensitivity:	25 $\mu$ V
Image Rejection Ratio:	45 dB
IF Rejection Ratio:	30 dB
Signal-to-Noise Ratio:	40 dB
Harmonic Distortion:	0.8%

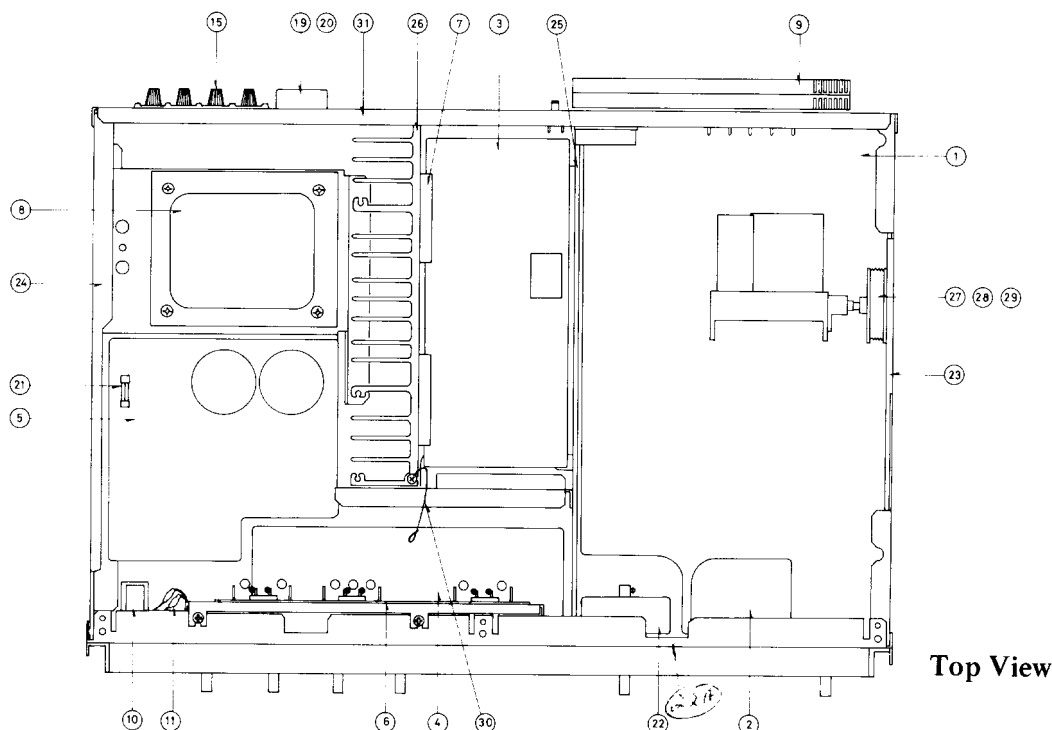
**GENERAL**

Power Supply:	AC 120 volts, 60 Hz (D model) AC 220 volts, 50 Hz (G model) AC 220/120 volts, 50/60 Hz (W model)
Outputs:	Speaker A & B, Phones, Tape Rec Out 1 & 2, AC Outlet ( $\times 2$ ) (D model)
Inputs:	Phono, Tape Play 1 & 2 FM and AM Antennas
Antennas:	FM: 300 ohms balanced and 75 ohms unbalanced AM: built-in ferrite core antenna and external terminal
Semiconductors:	1 FET, 20 transistors, 11 ICs, 38 diodes (D & W model) 1 FET, 22 transistors, 11 ICs, 38 diodes (G model)
Dimensions (W $\times$ H $\times$ D):	480 $\times$ 130 $\times$ 376 mm 19" $\times$ 5-1/8" $\times$ 14-13/16"
Weight:	11.4 kg, 25.1 lbs

Specifications and features are subject to change without notice.

**COMPONENT LOCATION**





## COMPONENT LOCATION-PARTS LIST

### D/W model

REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
1		13549581A	NARFE-781a, FM/AM tuner and equalizer amplifier p.c.b.
2		13549583	NASW-783, Switch p.c.b.
3		13549584	NADA-784, Power amplifier p.c.b.
4		13549586	NAAF-786, Tone amplifier p.c.b. (D)
		13550586B	NAAF-786b, Tone amplifier p.c.b. (W)
5		13549585	NAPS-785, Power supply circuit p.c.b.
6		13549587	NAPL-787, Meter illumination lamp p.c.b.
7	Q503, Q603	222022	STK-0050II, Power amplifier IC
8	T901	250350	NPT-696D, Power transformer (D)
		250361	NPT-696DG, Power transformer (W)
9	L152	232066	NMA-3012, AM bar antenna
10	C951	3500054	0.01μF, 125V, CS capacitor(D)
	C951, C952	3500058	PME265MB510, IS capacitor (W)
11	R528, R628	441623314	330Ω, 1W, Metal oxide film resistor
12	S706	25065016	NSS-2327, Slide switch
13	P804	25060008	Ground terminal
14	P805	25060035	NTM-4PRMC06, Antenna terminal
15	P806, P807	25060038	NTM-4PRMN09, Speaker terminal
16	P901, P902	25050032	S-I6444-01, AC outlet
17	W901	253099A	AS-UC-3, Power supply cord(D)
		253083	AS-CEE, Power supply cord(W)
18	W901a	270025	SR-3P-4, Strainrelief (D)
		270280	SR-4K-4, Strainrelief (W)
19	F501, F601	252014	4A-T, Speaker protection fuse
20		25050004	Fuseholder
21	F901	252049	4A(ST-6), AC fuse(D) (on the power supply p.c.b.)
		252014	4A-T, AC fuse(W) (on the power supply p.c.b.)
22		27205021	Drive shaft
23		27115058	Side bracket (R)
24		27115059	Side bracket (L)
25		27115060	Center bracket
26		27160062A	Radiator
27		270760A	Dial drum
28		273803A	SP-14A, Spring
29		273903	Stringing
30		273812	Spring for pointer lamp

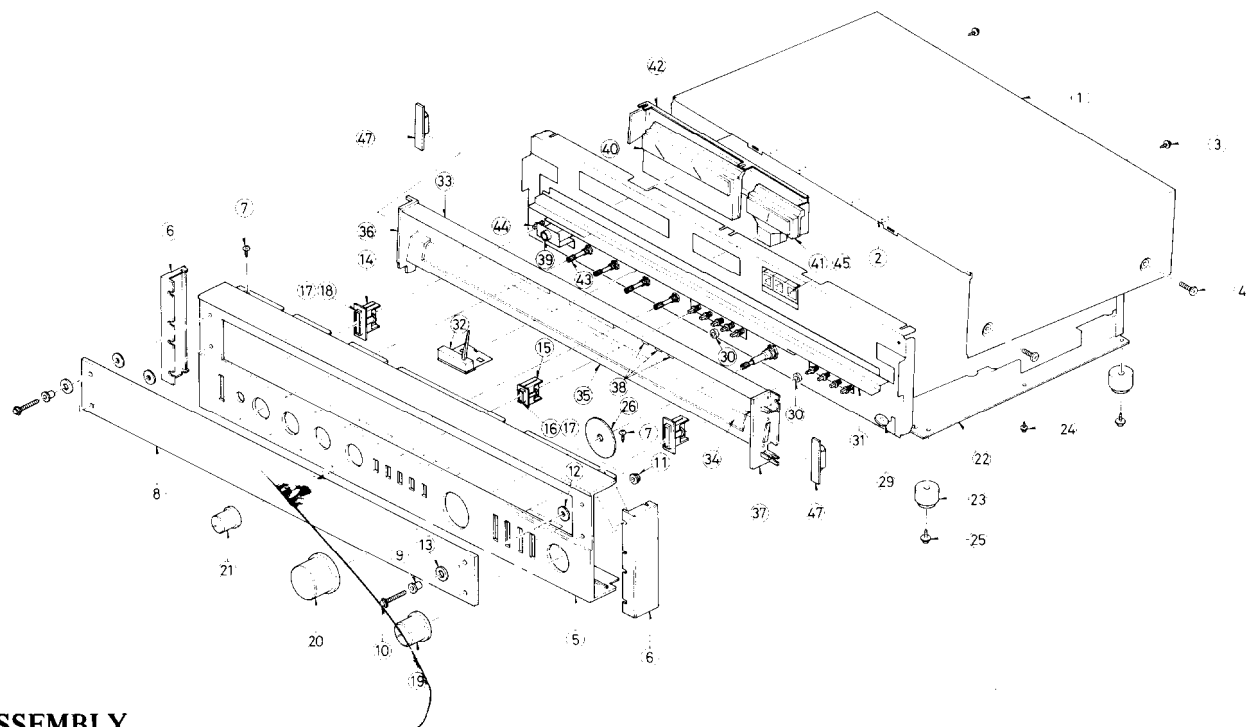
31

27120200	Back panel (D)
27120202	Back panel (W)
252025	2.5A-T, AC fuse(W)
250143	FF-1S4, Fuseholder(W) (on the chassis)
27300288	Switch locked plate(W)
25065109	NSS-2255P, Voltage selector switch(W) (on the back panel)

### G model

REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
1		13552581	NARFE-781, FM/AM tuner and equalizer amplifier p.c.b.
2		13549583	NASW-783, Switch p.c.b.
3		13549584	NADA-784, Power amplifier p.c.b.
4		13552586A	NAAF-786a, Tone amplifier p.c.b.
5		13552585A	NAPS-785a, Power supply circuit p.c.b.
6		13549587	NAPL-787, Meter illumination lamp p.c.b.
7	Q503, Q603	222022	STK-0050II, Power amplifier IC
8	T901	250351	NPT-696G, Power transformer
9	L152	232066	NMA-3012, AM bar antenna
10	C951	3500058	PME265MB510, IS capacitor
11	R528, R628	441623314	330Ω, 1W, Metal oxide film resistor
12	S706	25065016	NSS-2327, Slide switch
13	P804	25060008	Ground terminal
14	P805	25060035	NTM-4PRMC06, Antenna terminal
15	P806, P807	25060038	NTM-4PRMN09, Speaker terminal
17	W901	253083	AS-CEE, Power supply cord
18	W901a	270280	SR-4K-4, Strainrelief
19	F501, F601	252014	4A-T, Speaker protection fuse
20		25050004	Fuseholder
21	F901	252074	2A-SE-EAK, AC fuse
	F902, F903	252078	5A-SE-EAK (on the power supply p.c.b.)
22		27205021	Drive shaft
23		27115058	Side bracket (R)
24		27115059	Side bracket (L)
25		27115060	Center bracket
26		27160062A	Radiator
27		270760A	Dial drum
28		273803A	SP-14A, Spring
29		273903	Stringing
30		273812	Spring for pointer lamp
31		27120201	Back panel (D)

## EXPLODED VIEW



## DISASSEMBLY

**Top Cover**

Remove the four screws (4) holding the top cover and side bracket.

Remove the two screws (3) holding the top cover and back panel.

**Front Panel**

Remove the top cover.

Remove the TUNING knob.

Remove the five screws holding the front panel and front bracket.

**Bottom board**

Remove the four screws (24) holding the bottom board and chassis.

Remove the four screws (25) holding the bottom board and legs.

**Meters**

Remove the top panel.

Remove the two screws holding the lamp bracket and front bracket.

**Dial Glass**

Remove the four screws holding the dial glass and front panel.

Notes: The dial glass has been mounted by applying an 800 gr torque to the screws.

If the dial glass is removed during repairs, and a torque driver is available, apply 800 gr torque to the screws when replacing. If however, a torque driver is not available, simply tighten the screws by hand. When replacing the dial glass, insert all relevant component parts (9-13) in accordance with the exploded view.

**Pointer Lamp**

Remove the top cover and front panel.

## SERVICE PROCEDURES

**Sensor Switch (SENSOR)**

This switch enables the servo lock system for automatic FM tuning to be matched with the various operating conditions. Set it at LOW initially. Switch to NORM or HIGH if the TUNED lamp does not instantly turn off when you touch the tuning knob.

**Power Meter/Signal Strength Meter**

When the tuning is not being operated, this meter displays the level of power applied to the right speaker system. The instant the tuning knob is touched, the meter changes to display the signal strength of the radio broadcast being received at that moment. Tune a station so the needle moves as far to the right as possible.

**De-emphasis switch (Only W model)**

The 25  $\mu$ sec/Normal selector switch for Dolby FM broadcasts is located on the front panel. The 50  $\mu$ sec/75  $\mu$ sec selector switch employed in the W (120/220V) model is located on the bottom board. When shipped from the factory, this switch is set to the 50  $\mu$ sec position. For use in 75  $\mu$ sec regions, switch over to the 75  $\mu$ sec position.

**Voltage conversion (Only W model)**

This set may be set to operated at either 120V or 220V at 50Hz to 60Hz. This voltage selector switch is located on the back panel. If a voltage change, is necessary, remove the lock plate, switch to the proper voltage, and replace the plate.

**EXPLODED VIEW – PARTS LIST****D model**

REF. NO.	PARTS NO.	DESCRIPTION
1	28184071	Top cover
2	28140020	4tx10x40, Cushion
3	834430062	3STS+6BQ(BC), Tapping screw
4	838440083	4STB+8CQ(BC), Tapping screw
5	13549121	Front panel ass'y (5, 6, 14, 15)
6	28125076	End cap
7	834130062	3STS+6BQ, Tapping screw
8	28191050	Dial glass
9	~27270014	Spacer
10	27300038A	Special screw
11	86213010	WN3x10FN, Nut
12	870051	10x3.5x1.5t, Washer
13	~870052	10x6x1.5t, Washer
14	27267063	Guide for power switch knob
15	27267064	Guide for push switch knob
16	28320399	Push switch knob
17	27180049	Spring for knob
18	28320398	Power switch knob
19	28320396	Volume control knob
20	28320408	Tuning knob
21	28320397	Tone control knob
22	27170071	Bottom board
23	27175009	T-C, Leg
24	831130082	3STW+8BQ, Tapping screw
25	831130122	3STW+12BQ, Tapping screw
26	28140126	Cushion
29	27185002A	DP-16N, Dial pulley
30	27185006	Dial pulley
31	27130192	Bracket
32	13549131	Pointer ass'y
33	28133023	Back plate
34	28130087	Dial plate
35	27190065	Holder for dial plate
36	27250039A	Lamp case (L)
37	27250040A	Lamp case (R)
38	28198527	Facet
39	25045018	LJ-100-J, Stereo headphone jack
40	243117	NIND-0500S117 (Pointer: white), Signal strength and output level meter
	243129	NIND-0500S129 (Pointer: Red)
41	243118	NIND-0250S118 (Pointer: White), Center meter
	243130	NIND-0250S130 (Pointer: Red), Center meter
42	27130193	Bracket for meter
43	25030150	NRS-144-40Y, Speaker selector switch
44	25035047	NPS-111-L12P, Power switch
45	210078	PL12V0.03AW-4, Locked, Tuned, and Stereo indicator lamp
47	15349599	NAPL-799, Dial illumination lamp p.c.b.

**G/W model**

REF. NO.	PARTS NO.	DESCRIPTION
1	28184072	Top cover
2	28140020	4tx10x40, Cushion
3	834430062	3STS+6BQ(BC), Tapping screw
4	838440083	4STB+8CQ(BC), Tapping screw
5	13549121	Front panel ass'y (5, 6, 14, 15)
6	28125076	End cap
7	834130062	3STS+6BQ, Tapping screw
8	28191050	Dial glass
9	27270014	Spacer
10	27300038B	Special screw
11	86213010	WN3x10FN, Nut
12	870051	10x3.5x1.5t, Washer
13	870052	10x6x1.5, Washer
14	27267063	Guide for power switch knob
15	27267064	Guide for push switch knob
16	28320399	Push switch knob
17	27180049	Spring for knob
18	28320398	Power switch knob
19	28320396	Volume control knob
20	28320408	Tuning knob
21	28320397	Tone control knob
22	27170071	Bottom board
23	27175009	T-C, Leg
24	831130082	3STW+8BQ, Tapping screw
25	831130122	3STW+12BQ, Tapping screw
26	28140126	Cushion
29	27185002A	DP-16N, Dial pulley
30	27185006	Dial pulley
31	27130192	Bracket
32	13549131	Pointer ass'y
33	28133023	Back plate
34	28130087	Dial plate
35	27190065	Holder for dial plate
36	27250039A	Lamp case (L)
37	27250040A	Lamp case (R)
38	28198527	Facet
39	25045018	LJ-100-J, Stereo headphone jack
40	243117	NIND-0500S117(Pointer: White), Signal strength and output level meter
	243129	NIND-0500S129 (Pointer: Red)
41	243118	NIND-0250S118 (Pointer: White), Center meter
	243130	NIND-0250S130 (Pointer: Red), Center meter
42	27130193	Bracket for meter
43	25030150	NRS-144-40Y, Speaker selector switch
44	25035176	NPS-111-L140, Power switch (G)
	25035034	NPS-121-L, Power switch (W)
45	210078	PL12V0.03AW-4, Locked, Tuned, and Stereo indicator lamp
47	15349599	NAPL-799, Dial illumination lamp p.c.b.

(W): Only 12/220 V model (G): Only 220 V model (D): Only 120 V model

**PRECAUTIONS****Fuses**

For continued protection against fire hazard, replace only with same type and same rating fuse.

Speaker protection fuse: The speaker protection fuse is located on the back panel. Remove the screw holding the fuse cover and fuse case.

Rating: 4A-T (Parts No.: 252014)

AC fuse: Remove the top cover. The AC fuse is located on the power supply pc board.

Rating: F901 4A (ST-6) (Parts No.: 252049) (Only 120V model)

F901 2A-SE-EAK (Parts No.: 252074) (Only 220V model)

F902, F903 5A-SE-EAK (Parts No.: 252078) (Only 220V model)

F901 4A-T (Parts No.: 252014) (Only 120/220V model)

F902 2.5A-T (Parts No.: 252025) (Only 120/220V model) (on the chassis)

## ALIGNMENT PROCEDURES

### INSTRUMENTS REQUIRED

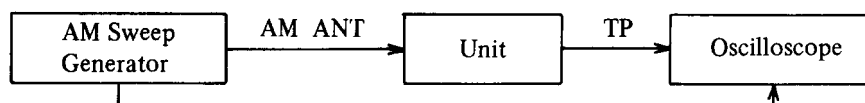
1. DC Voltmeter
2. AM Sweep Generator
3. AM/FM Signal Generator
4. AC VTVM
5. Oscilloscope
6. Monitorscope
7. Distortion Analyzer
8. Stereo Modulator
9. Frequency Counter

### GENERAL ALIGNMENT CONDITIONS

1. Signal input should be kept as low as possible.
2. Standard modulation is 400Hz 30% (AM), 1kHz 100% (FM MONO), pilot 9% sub and main 91% (FM STEREO).
3. Standard knob position  
 SPEAKERS . . . . . A  
 BASS, TREBLE & BALANCE . . . . . Center  
 HIGH FILTER . . . . . OFF  
 MODE . . . . . STEREO  
 DE-EMPHA . . . . . NORMAL  
 LOUDNESS . . . . . OFF  
 MUTING LOCK . . . . . OFF  
 TAPE 1, 2 . . . . . OFF (SOURCE)

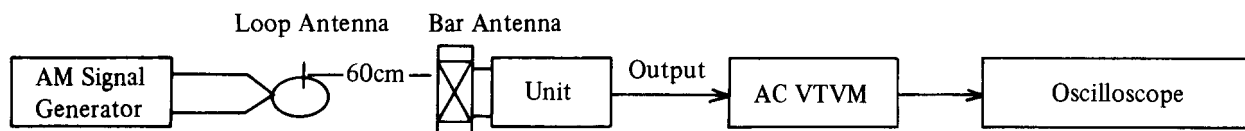
#### (1) AM IF ALIGNMENT

1. Set SELECTOR switch to AM.
2. Set radio dial to quiet point.



Set signal	Adjust	Oscilloscope	Remarks
455kHz	X151	Maximum Symmetrical Response	Usually not necessary to adjust

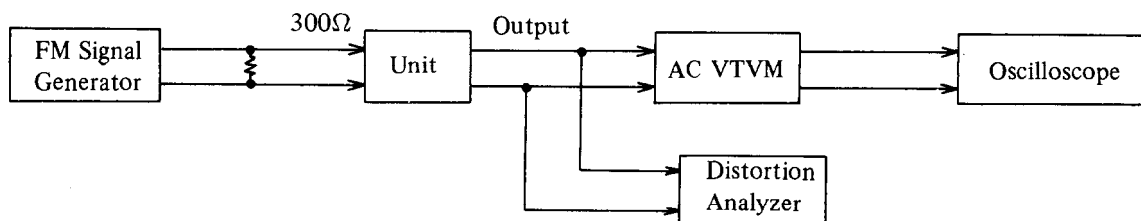
#### (2) AM RF ALIGNMENT



Step	Set Signal	Set Radio Dial	Adjust	VTVM reading	Remarks
1	515kHz 400Hz 30%	Lower end (515kHz)	L153	Maximum	Repeat steps 1 and 2 as necessary
2	1680kHz 400Hz 30%	Upper end (1680kHz)	TC152	Maximum	
3	600kHz 400Hz 30%	600kHz	L151	Maximum	Repeat steps 3 and 4 as necessary
4	1400kHz 400Hz 30%	1400kHz	TC151	Maximum	

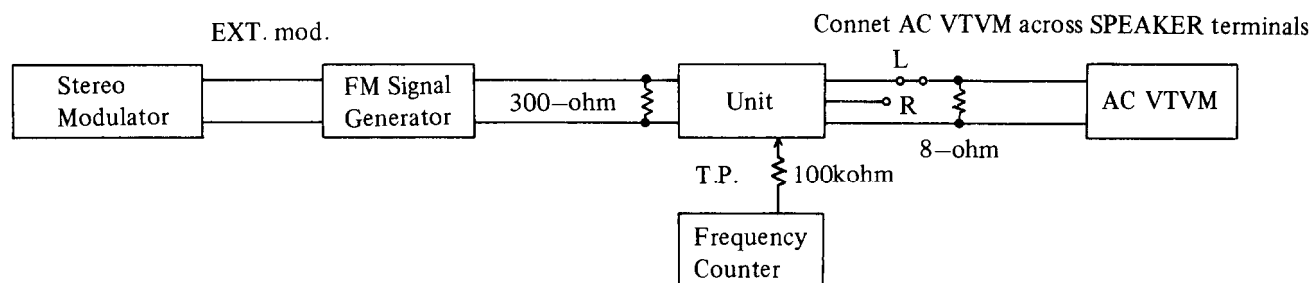
#### (3) FM FRONT END ALIGNMENT

1. Set SELECTOR switch to FM.
2. Connect FM Signal Generator to 300-ohm antenna terminals.

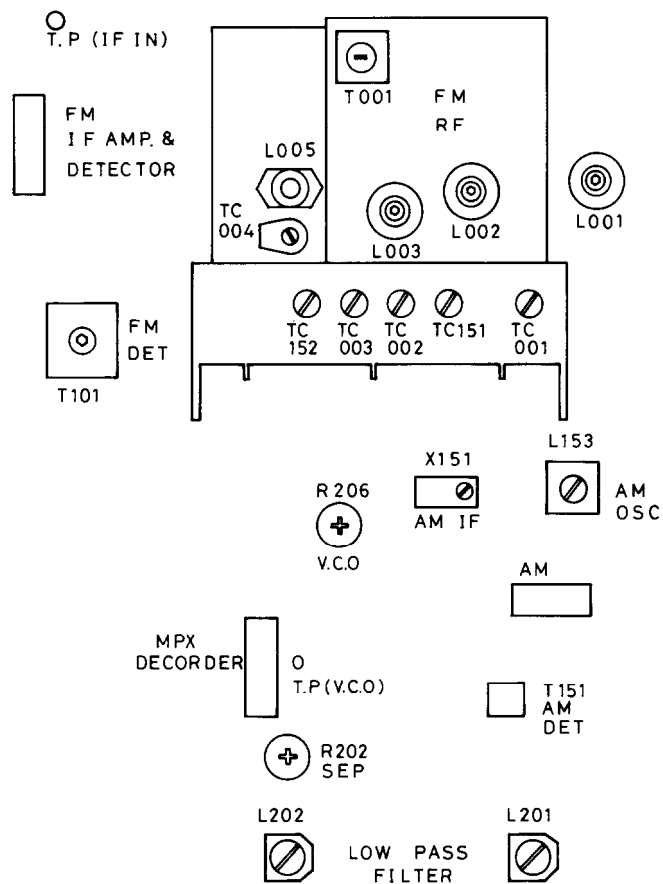


Step	FM Signal Generator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
1	No signal	Quiet Point	T101 Bottom	Tuning Indicator	Center	Repeat Steps 1 and 2 as necessary
2	98MHz 65dBf 1kHz 75kHz div.	98MHz	T101 Top	Distortion Analyzer	Minimum	
3	90MHz 65dBf 1kHz 75kHz div.	90MHz	L005	Tuning Indicator	Center	Repeat Steps 3 and 4 as necessary
4	106MHz 65dBf 1kHz 75kHz div.	106MHz	TC004		Center	
5	90MHz 20dBf 1kHz 75kHz div.	90MHz	L001~L003	AC VTVM or Oscilloscope	Maximum	Repeat Steps 5 and 6 as necessary
6	106MHz 20dBf 1kHz 75kHz div.	106MHz	TC001~TC003		Maximum	
7	98MHz 65dBf 1kHz 75kHz div.	98MHz	T001	Distortion Analyzer	Minimum	

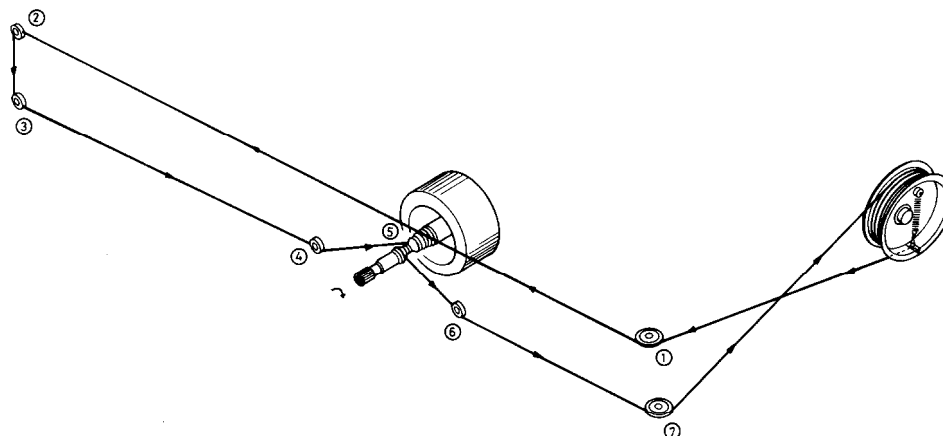
#### (4) MULTIPLEX ALIGNMENT



Step	FM Signal Generator	Stereo Modulator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
1	98MHz no mod. 65dBf	—	98MHz	R206	Frequency Counter	19000±19Hz	
2	STEREO INDICATOR should light up when stereo program is being received.						
3	98MHz EXT. Mod. 65dBf	Pilot Sig. 9% Main & Sub Sig. 1KHz Lch 91%	98MHz	R202	AC VTVM Right ch.	Minimum	Repeat Steps 3 & 4 as necessary
4	Same as above	Pilot Sig. 9% Main & Sub Sig. 1KHz Rch 91%	98MHz	R202	AC VTVM Left ch.	Minimum	



## STRINGING DIAGRAM

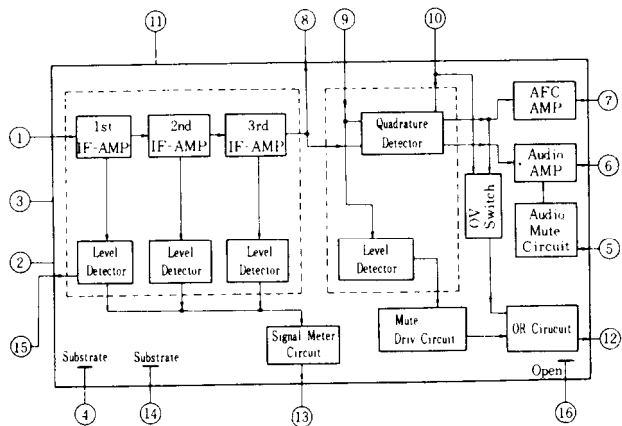


1. Close the variable capacitor complete and tie the dial cord to the spring of the drum.
2. Thread the dial cord in the direction of arrow from ① to ④ and wind the dial cord three turns around the tuning shaft clockwise.
3. Thread the dial cord ⑥ and ⑦.
4. Wind the dial cord  $1\frac{1}{2}$  turns around the dial drum.

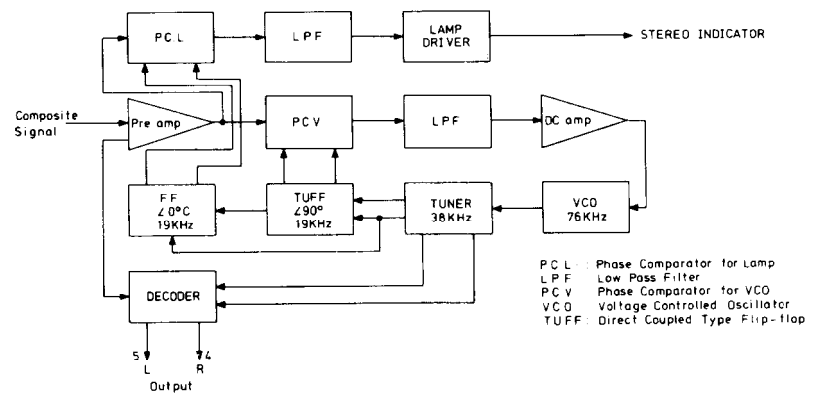


## IC BLOCK DIAGRAM

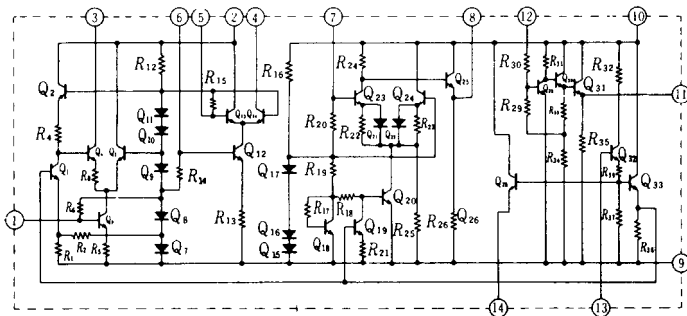
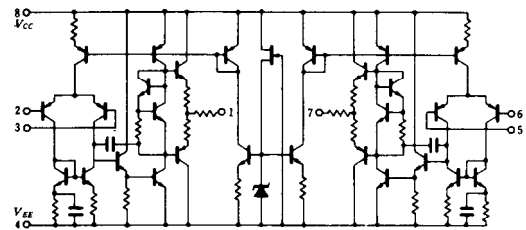
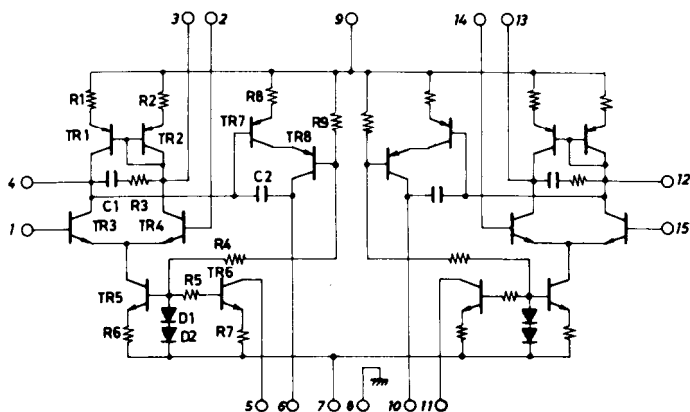
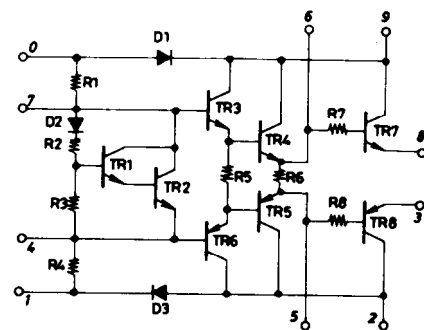
## HA-1137 BLOCK DIAGRAM



## LA3350 BLOCK DIAGRAM



## HA-1151 EQUIVALENT CIRCUIT

**NJM4558D, 4559DX****STK3062****STK-0050II**

**PRINTED CIRCUIT BOARD-PARTS LIST (D/W model)****FM/AM TUNER AND EQUALIZER AMPLIFIER  
PC BOARD (NARFE-781a) – PARTS LIST**

CIRCUIT NO. PARTS NO. DESCRIPTION

**ICs**

Q102	222421	HA1137W
Q151	222418	HA1151
Q201	222449	LA3350
Q301, Q401	222534	NJM4559DX
Q701	222465	NJM4558D

**Transistors**

Q001	2211815	2SK191M-GR, F.E.T
Q002	2211845	2SC785TM-O(ONK)
Q003	2211342	2SC461(B)
Q101	2211722, 2211723 or 2210823	2SC1923(O), 2SC1923(R) or 2SC1675(L-1)
Q202	2211256	2SC1815(BL)
Q203	2211256, 2211255 or 2210746	2SC1815(BL), 2SC1815(GB) or 2SC945(A)P
Q706~Q704		
Q705	2211256	2SC1815(BL)

**Diodes**

D001	223110	1S2687
D101, D102	223105	1S1555
D151, D153	223105	1S1555
D152	4000022	VD1212
D202	223105	1S1555
D701, D702		
D704~D708		
D703	224011 or 223943	YZ047 or RD4.7EB

**Coils**

L001	233106 or 233088-1	NFA-3009 or FFA-3001
L002	233112	NFRF-3008
L003	233113	NFRF-3009
L004	233152	NFT-1503
L005	233090	NFO-3003
L101, L102	233105	NCH-1005
L103	233114	NCH-1009
L151	233152	NFT-1503
L153	232065	NMO-2002
L201, L202	233021 or 233107	NMC-8-5 or NMC-5002

**Transformers**

T001	233085	NIT-0518
T101	233101 or 233083	NFIF-6003 or NIT-3516
T151	232041	NIT-0509

**Ceramic filters**

X101, X102	3010003	SFE-10.7MA
X151	3010004	CFZ-455C

**Capacitors**

VC001~VC004	3050006	NVC-20FQ327WD02, Variable
TC004	3060003	NTC-10P02, Trimmer
C021	352741019T	100μF, 16V, Elect.
C106	352750479T	4.7μF, 25V, Elect.
C108	352741009T	10μF, 16V, Elect.
C109	352782209T	22μF, 50V, Elect.
C118	352750339T	3.3μF, 25V, Elect.
C153	372523614	360pF±5%, 50V, ST
C158	352741009T	10μF, 16V, Elect.
C159	352742219	220μF, 16V, Elect.
C162	352780109T	1μF, 50V, Elect.
C163	352780339T	3.3μF, 50V, Elect.
C165	352721019T	100μF, 6.3V, Elect.
C201	352744719	470μF, 16V, Elect.
C202	352780109T	1μF, 50V, Elect.
C203	352741009T	10μF, 16V, Elect.
C204	392883397T	0.33μF, 50V, LL
C205	392882297T	0.22μF, 50V, LL
C206	392884797T	0.47μF, 50V, LL
C207	372521524	1,500pF±5%, 50V, ST
C209	352780339T	3.3μF, 50V, Elect.
C211, C212	352781099T	0.1μF, 50V, Elect.
C301, C401	352780229T	2.2μF, 50V, Elect.

C304, C404	352721019T	100μF, 6.3V, Elect.
C309, C409	392880227T	2.2μF, 50V, LL
C311, C312	352780339T	3.3μF, 50V, Elect.
C702	352780109T	1μF, 50V, Elect.
C703	352742209T	22μF, 16V, Elect.
C706	352784799T	0.47μF, 50V, Elect.
C707	352741009T	10μF, 16V, Elect.
C708	352784799T	0.47μF, 50V, Elect.
C709	352732209T	22μF, 10V, Elect.
C710	352744709T	47μF, 16V, Elect.
C711	352721019T	100μF, 6.3V, Elect.
C713	352742219	220μF, 16V, Elect.
C714	352741009T	10μF, 16V, Elect.

**Resistors**

R202	5225024	N10HR1KBD, Semi-fixed
R206	5225019	N10HR4.7KBD, Semi-fixed
R356, R456	5148042	N16RGL100KBTP40, Volume control variable

**Switch**

S801~S804	25035186	NPS-242-222-L150, Selector/Tape monitor
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**Terminals**

P801	25045020	NPJ-4PDBL11, Phono/Tape rec. 2
P802	25045041	NPJ-6PDBL18, Tape 1/Tape pb. 2

**Shielded case**

27225029

**Shielded plate**

27150085

**POWER AMPLIFIER PC BOARD  
(NADA-784) – PARTS LIST**

CIRCUIT NO. PARTS NO. DESCRIPTION

**ICs**

Q501, Q601	222023	STK3062
Q502, Q602	222502	NJM4558DX
Q503, Q603	222022	STK-0050II

**Transistors**

Q751, Q752	2211544	2SC1959(Y)
Q903, Q904, Q906	2211255, 2211256 or 2210746	2SC1815(GB), 2SC1815(BL) or 2SC945(A)P
Q905	2211455 or 2210803	2SA1015(GB) or 2SA733(P)

**Diodes**

D501, D502, D601, D602	223105	1S1555
D751~D754, D757	223103 or 223132	1N60 or 1K60
D755, D756	233119	1S1588
D908	223848 or 223804	GP-08B or SR1K-2
D909, D910	233105	1S1555

**Capacitors**

C501, C601	352780339T	3.3μF, 50V, Elect.
C506, C606	352780109T	1μF, 50V, Elect.
C510, C511, C610, C611	352780479T	4.7μF, 50V, Elect.
C513, C514	392852207T	22μF, 25V, LL
C613, C614		
C516, C616	352780339T	3.3μF, 50V, Elect.
C751, C752	352780229T	2.2μF, 50V, Elect.
C753, C754	352781009T	10μF, 50V, Elect.
C921	352753309T	33μF, 25V, Elect.
C922	352722219	220μF, 6.3V, Elect.

C362, C462	352780109T	1 $\mu$ F, 50V, Elect.
C375, C376	352754719T	470 $\mu$ F, 25V, Elect.
C377, C378	352750339T	3.3 $\mu$ F, 25V, Elect.
<b>Resistors</b>		
R361, R461	5148038	N16RGM11C100KCO40, Treble control variable
R366, R466	5148039	N16RGM11C100KCS40, Bass control variable
R371, R471	5146017	N16RLC100KWTTP40, Balance control variable
R375	441623314	330 $\Omega$ , 1W, Metal oxide film
<b>Switches</b>		
	25035174	NPS-522-L138, High filter/ Mode/Loudness/FM muting/ De-emphasis

## TONE AMPLIFIER PC BOARD (NAAF-786b) – PARTS LIST (W model)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	<b>IC</b>	
Q351, Q451	222534	NJM-4559DX
	<b>Diode</b>	
D375, D376	224072	BZ-177
	<b>Capacitors</b>	
C353, C453	392880227T	2.2 $\mu$ F, 50V, LL
C356, C456	392880107T	1 $\mu$ F, 50V, LL
C361, C461	352742209T	22 $\mu$ F, 16V, Elect.
C362, C462	352780109T	1 $\mu$ F, 50V, Elect.
C375, C376	352754719T	470 $\mu$ F, 25V, Elect.
C377, C378	352750339T	3.3 $\mu$ F, 25V, Elect.
	<b>Resistors</b>	
R361, R461	5148038	N16RGM11C100KCO40, Treble control variable
R366, R466	5148039	N16RGM11C100KCS40, Bass control variable
R371, R471	5146017	N16RLC100KWTP40, Balance control variable
R375	441623314	330 $\Omega$ , 1W, Metal oxide film
	<b>Switches</b>	
	25035174	NPS-522-L138, High filter/ Mode/Loudness/FM muting/ De-emphasis
	250142	NS5-2225, De-emphasis

## METER ILLUMINATION LAMP PC BOARD (NAPL-787) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL803~PL805	210054B	PL6.3V, 0.25A, Pilot lamp

**DIAL PLATE ILLUMINATION PC BOARD (NAPL-799) – PARTS LIST**

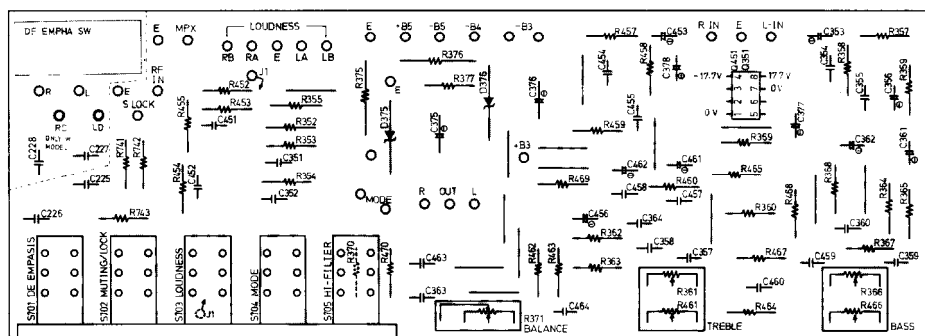
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	210054A	PL6.3V, 0.25A, Pilot lamp

## DIAL PLATE ILLUMINATION PC BOARD (NAPL-799) – PARTS LIST

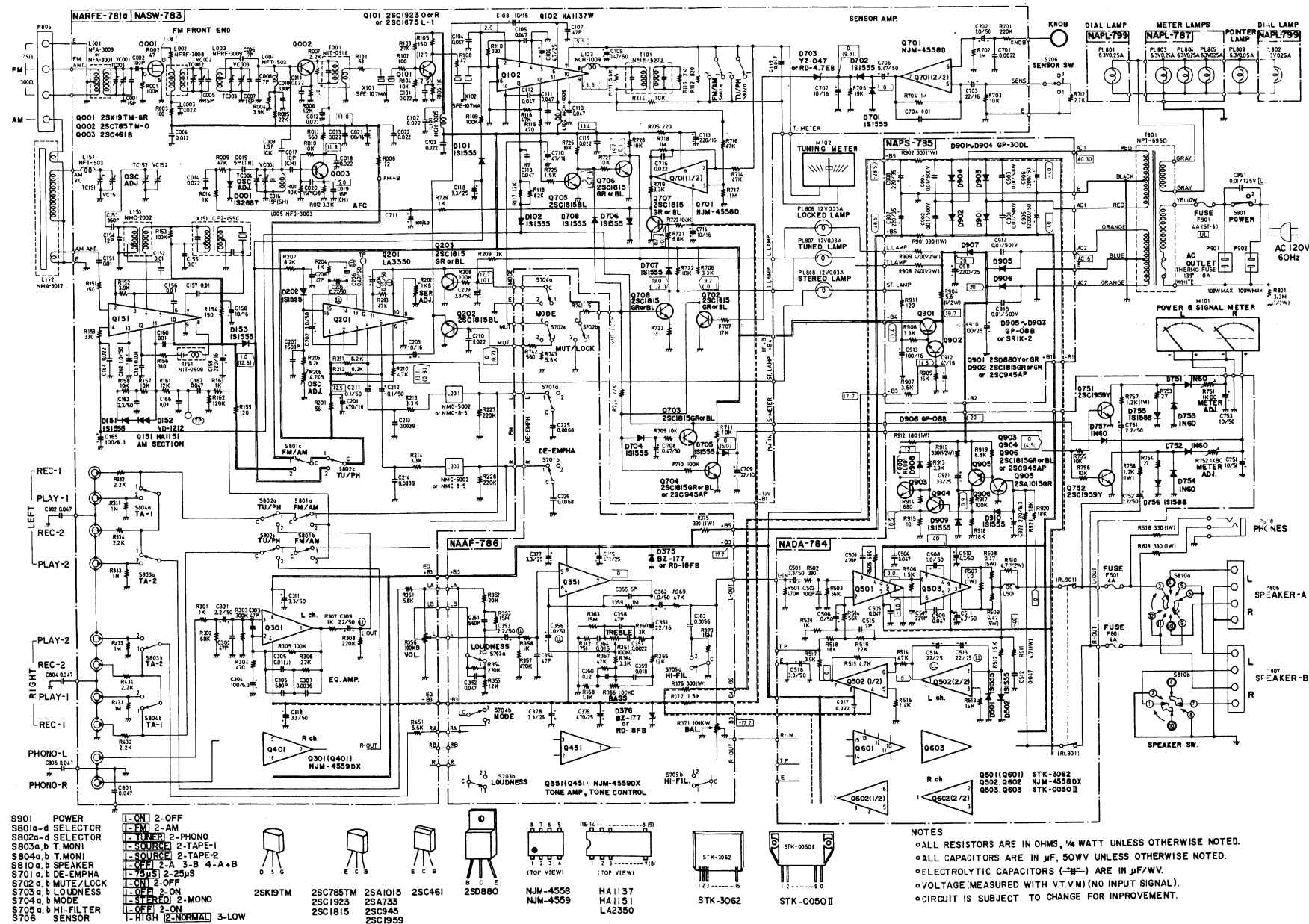
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	210054A	PL6.3V, 0.25A, Pilot lamp

1. DC voltage are measured with V.T.V.M. to chassis at no signal applied.
2. Capacitor      LL: Low leakage current type electrolytic capacitor  
                     ST: Polystyren film capacitor

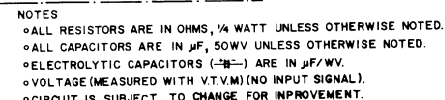
### TONE AMPLIFIER PC BOARD VIEW FROM BOTTOM SIDE (D model)



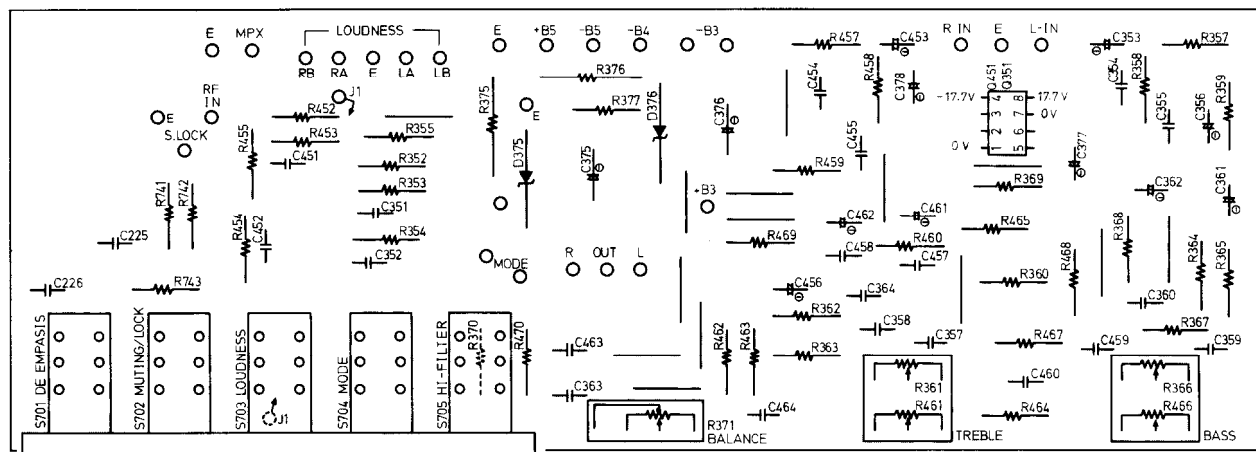
MODEL TX-3000 D



MODEL TX-3000 G



## TONE AMPLIFIER PC BOARD VIEW FROM BOTTOM SIDE (G/W model)



## PRINTED CIRCUIT BOARD-PARTS LIST

FM/AM TUNER AND EQUALIZER  
AMPLIFIER PC BOARD (NARFE-781) –  
PARTS LIST

CIRCUIT NO. PARTS NO. DESCRIPTION

## ICs

Q102	222421	HA1137W
Q151	222418	HA1151
Q201	222449	LA3350
Q301, Q401	222534	NJM4559DX
Q701	222465	NJM4558D

## Transistors

Q001	2211815	2SK19TM-GR
Q002	2211845	2SC785TM-O(ONK)
Q003	2211342	2SC461(B)
Q101	2211722,	2SC1923(O),
	2211723 or	2SC1923(R) or
	2210823	2SC1675(L-1)
Q202	2211256	2SC1815(BL)
Q203	2211256,	2SC1815(BL),
Q702~Q704	2211255 or	2SC1815(GR) or
Q706~Q708	2210746	2SC945(A)P
Q205, Q206	2211405,	2SC2240(GR),
	2211406,	2SC2240(BL),
	2211732 or	2SC1845(E) or
	2211733	2SC1845(F)
Q705	2211256	2SC1815(BL)

## Diodes

D001	223110	1S2687
D101, D102	223105	1S1555
D151, D153	223105	1S1555
D152	4000022	VD1212
D202	223105	1S1555
D701, D702		
D704~D708		
D703	224011 or	YZ047 or
	223943	RD4.7EB

## Coils

L001	233106 or	NFA-3009 or
	233088-1	FFA-3001
L002	233112	NFRF-3008
L003	233113	NFRF-3009
L004	233152	NFT-1503
L005	233090	NFO-3003
L101, L102	233105	NCH-1005
L103	233114	NCH-1009
L151	233152	NFT-1503
L153	232065	NMO-2002
L201, L202	233126	NMC-5008

## Transformers

T001	233085	NIT-0518
T101	233101 or	NFIF-6003 or
	233083	NIT-3516
T151	232041	NIT-0509

## Ceramic filters

X102, X102	3010003	SFE-10.7MA
X151	3010004	CFZ-455C

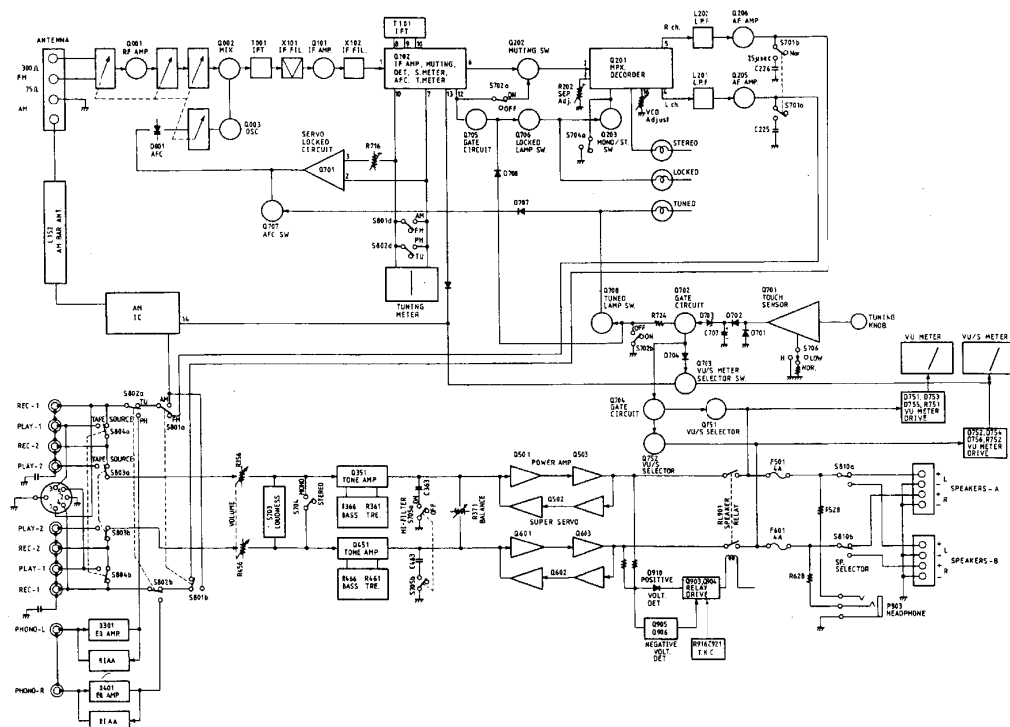
## Capacitors

VC001~VC004	3050006	NVC-20FQ327WD02, Variable
TC004	3060003	NTC-10P02, Trimmer
C021	352741019T	100μF, 16V, Elect.
C106	352750479T	4.7μF, 25V, Elect.
C108	352741009T	10μF, 16V, Elect.
C109	352782209T	22μF, 50V, Elect.
C118	352750339T	3.3μF, 25V, Elect.
C153	372523614	360pF±5%, 50V, ST
C158	352741009T	10μF, 16V, Elect.
C159	352742219	220μF, 16V, Elect.
C162	352780109T	1μF, 50V, Elect.
C163	352780339T	3.3μF, 50V, Elect.
C165	352721019T	100μF, 6.3V, Elect.
C201	352744719	470μF, 16V, Elect.
C202	352780109T	1μF, 50V, Elect.
C203	352741009T	10μF, 16V, Elect.
C204	392883397T	0.33μF, 50V, LL
C205	392882297T	0.22μF, 50V, LL
C206	392884797T	0.47μF, 50V, LL
C207	372521524	1,500pF±5%, 50V, ST
C209	352780339T	3.3μF, 50V, Elect.
C211, C212	352780109T	1μF, 50V, Elect.
C215, C216		
C219, C220	392883397T	0.33μF, 50V, LL
C301, C401	352780229T	2.2μF, 50V, Elect.
C304, C404	352721019T	100μF, 6.3V, Elect.
C309, C409	392880227T	2.2μF, 50V, LL
C311, C312	352780339T	3.3μF, 50V, Elect.
C702	352780109T	1μF, 50V, Elect.
C703	352742209T	22μF, 16V, Elect.
C706	352784799T	0.47μF, 50V, Elect.
C707	352741009T	10μF, 16V, Elect.
C708	352784799T	0.47μF, 50V, Elect.
C709	352732209T	22μF, 10V, Elect.
C710	352744709T	47μF, 16V, Elect.
C711	352721019T	100μF, 6.3V, Elect.
C713	352742219	220μF, 16V, Elect.
C714	352741009T	10μF, 16V, Elect.

## Resistors

R202	5225024	N10HR1KBD, Semi-fixed
R206	5225019	N10HR4.7KBD, Semi-fixed
R356, R456	5148042	N16RGL100KBTP40, Volume control variable

## BLOCK DIAGRAM



## CIRCUIT DESCRIPTION

### 1. Touch sensor

The purpose of this circuit is to operate both the power/signal strength meter and servo locked circuit switching transistors.

#### 1.1 Servo locked circuit switching circuit

In order to ensure accurate tuning, the servo locked circuit is turned off automatically once the tuning knob is touched, and also when the muting circuit is switched off.

When a station is turned, Q702 will turn off and Q708 turn on (since Q705 will already be off and Q706 on), resulting in the TUNED lamp turning on. And since Q707 will turn off when Q708 turns on, the servo locked circuit will also begin to operate.

When the tuning knob is touched, a certain amount of hum is induced.

This hum is amplified by Q701, rectified by D701 and D702 into a DC signal, and applied to Q702 is consequently turned on, resulting in the servo locked circuit being switched off. If, however, the hum level is rather low, the tuned lamp might not turn on even when the tuning knob is touched. If this happens, reset the back panel sensor switch to either the Normal or High position.

#### 1.2 Power/signal strength meter

When the tuning knob is not being operated, this meter displays the level of power applied to be right speaker system. The instant the tuning knob is touched, the meter changes to display the signal strength of the radio broadcast.

When the tuning knob is touched, Q702 turns on. And since Q703 and Q704 turn off and Q751 and Q752 turn on, and power/signal strength meter is changed to signal strength meter from power meter.

### 2. Protection circuit

The protection circuit is operated:

(1) When the B circuit is unstable when the power is turned ON (approximately 5 seconds)

(2) When the center voltage has increased because of trouble at the differential amplifier, etc.

When the voltage detector is operated by abnormal voltage Q904 is turned ON by the voltage drop across R918. Q904, Q903 constitute a digitalized, fast response Schmitt trigger circuit. When Q904 is turned ON, Q903 is turned OFF. Q903 is a relay drive transistor. When it is turned OFF, the relay is also turned OFF.

When the power switch is turned ON, charging current flows thru the loop R916 → C921 → R917 → R918 and Q904 is turned ON by the voltage drop across R918. Consequently, Q903 and the relay are turned OFF until the charging current drops below a certain value. When the power switch is turned OFF, the B voltage falls and C921 is quickly discharged thru the loop R916 → C921 → D909. During normal operation, C921 is charged to almost the B voltage. But since the saturation resistance of Q904 is sufficiently low, when Q904 is turned ON, C921 is quickly discharged thru the loop C921 → R917 → Q904 and the relay is also turned OFF. The relay is not turned ON again thereafter until C921 is charged, even if the set should return to normal and Q903 is turned OFF.

### 3. Muting Circuit

The Quadrature detector IC incorporates an IF level detector circuit (output at pin 12). If the IF signal level drops below the muting level, pin 12 will be switched to high level, turning Q202 on. Consequently, the detector output signal will be cut off before it can be applied to the multiplex IC. When, on the other hand, the IF signal level is higher than the muting level, the Q102 pin 12 will be switched to low level, turning Q202, and Q705 off. Q706 will therefore turn on, followed by the LOCKED lamp turning on.

### 4. Servo Locked Circuit

The DC potential difference across both ends of the tuning meter (corresponding to the DC portion of the ratio detector output) is amplified by the Q701 operational amplifier in order to increase the AFC control capacity.

S801~S804	<b>Switch</b>	
	25035186	NPS-242-222-L150, Selector/ Tape monitor
	<b>Terminals</b>	
P801	25045020	NPJ-4PDBL11, Phono/ Tape rec. 2
P802	25045041	NPJ-6PDBL18, Tape 1/ Tape pb. 2
P803	250199	S-I3316, Din
<b>Shielded case</b>		
27225029		
<b>Shielded plate</b>		
27150085		

### POWER AMPLIFIER PC BOARD (NADA-784) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
<b>ICs</b>		
Q501, Q601	222023	STK3062
Q502, Q602	222502	NJM4558DX
Q503, Q603	222022	STK-0050II
<b>Transistors</b>		
Q751, Q752	2211544	2SC1959(Y)
Q903, Q904	2211255,	2SC1815(GR),
Q906	2211256 or	2SC1815(BL) or
	2210746	2SC945(A)P
Q905	2211455 or	2SA1015(GR) or
	2210803	2SA733(P)
<b>Diodes</b>		
D501, D502	223105	1S1555
D601, D602	223103 or	1N60 or
D751~D754		
D757		
D755, D756		
D908	223848 or	GP-08B or
	223804	SR1K-2
D09, D910	223105	1S1555
<b>Capacitors</b>		
C501, C602	352780339T	3.3 $\mu$ F, 50V, Elect.
C506, C606	352780109T	1 $\mu$ F, 50V, Elect.
C510, C511,	352780479T	4.7 $\mu$ F, 50V, Elect.
C610, C611	392852207T	22 $\mu$ F, 25V, LL
C513, C514,		
C613, C614		
C516, C616		
C751, C752	352780339T	3.3 $\mu$ F, 50V, Elect.
C753, C754	352780229T	2.2 $\mu$ F, 50V, Elect.
C921	352781009T	10 $\mu$ F, 50V, Elect.
C922	352753309T	33 $\mu$ F, 25V, Elect.
	352722219	220 $\mu$ F, 6.3V, Elect.
<b>Resistors</b>		
R507, R607	451730104	1 $\Omega$ , 2W, Metal
R508, R509,	4000047	0.47 $\Omega$ , 5W, Metal plate
R608, R609	5225018	N10HR1KBC, Semi-fixed
R751, R752		
R757, R758		
R912		
	441621224	1.2k $\Omega$ , 1W, Metal oxide film
	441621814	180 $\Omega$ , 1W, Metal oxide film
<b>Coil</b>		
L501, L502	231001	S-1.3B
<b>Relay</b>		
RL901	25065085A	NRL-2P5A-DC12-03

### POWER SUPPLY PC BOARD (NAPS-785a) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
<b>Transistors</b>		
Q901	2201075 or	2SD880(Y) or
	2201074	2SD880(GR)
Q902	2211256,	2SC1815(GR),
	2211255 or	2SC1815(BL) or
	2210746	2SC945(A)P
<b>Diodes</b>		
D901~D904	223863	GP-30DL
D905~D907	223848 or	GP-08B or
	223804	SR1K-2

<b>Capacitors</b>		
C905, C906	3504125	12,000 $\mu$ F, 50V, Elect.
C907, C908	352762219	220 $\mu$ F, 35V, Elect.
C910	352751019	100 $\mu$ F, 25V, Elect.
C911	352752229	2,200 $\mu$ F, 25V, Elect.
C912	352744709P	47 $\mu$ F, 16V, Elect.
C913	352741019P	100 $\mu$ F, 16V, Elect.
<b>Resistors</b>		
R901, R902	441623014	300 $\Omega$ , 1W, Metal oxide film
R904	451530564	5.6 $\Omega$ , 1/2W, Metal
<b>Radiator</b>		
	27160011A	Radiator
<b>Fuseholder</b>		
	25050052	SN5053
<b>Fuses</b>		
F901	252074	2A-SE-EAK
F902, F903	252078	5A-SE-EAK
<b>Fuse label</b>		
	29360364	T2A/250V

### tone AMPLIFIER PC BOARD (NAAF-786a) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
<b>IC</b>		
Q351, Q451	222534	NJM-4559DX
<b>Diode</b>		
D375, D376	224072 or	BZ-177 or
	224000	RD-18FB
<b>Capacitors</b>		
C353, C453	392880227T	2.2 $\mu$ F, 50V, LL
C356, C456	392880107T	1 $\mu$ F, 50V, LL
C361, C461	352742209T	22 $\mu$ F, 16V, Elect.
C362, C462	352780109T	1 $\mu$ F, 50V, Elect.
C375, C376	352754719T	470 $\mu$ F, 25V, Elect.
C377, C378	352750339T	3.3 $\mu$ F, 25V, Elect.
<b>Resistors</b>		
R361, R461	5148038	N16RGM11C100KC040, Treble control variable
R366, R466	5148039	N16RGM11C100KCS40, Bass control variable
R371, R471	5146017	N16RLC100KWTP40, Balance control variable
R375,	441623314	330 $\Omega$ , 1W, Metal oxide film
<b>Switches</b>		
	25035174	NPS-522-L138, High filter/ Mode/Loudness/FM muting/ De-emphasis

### METER ILLUMINATION LAMP PC BOARD (NAPL-787) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL803~PL805	210054B	PL6.3V, 0.25A, Pilot lamp

### DIAL PLATE ILLUMINATION PC BOARD (NAPL-799) – PARTS LIST

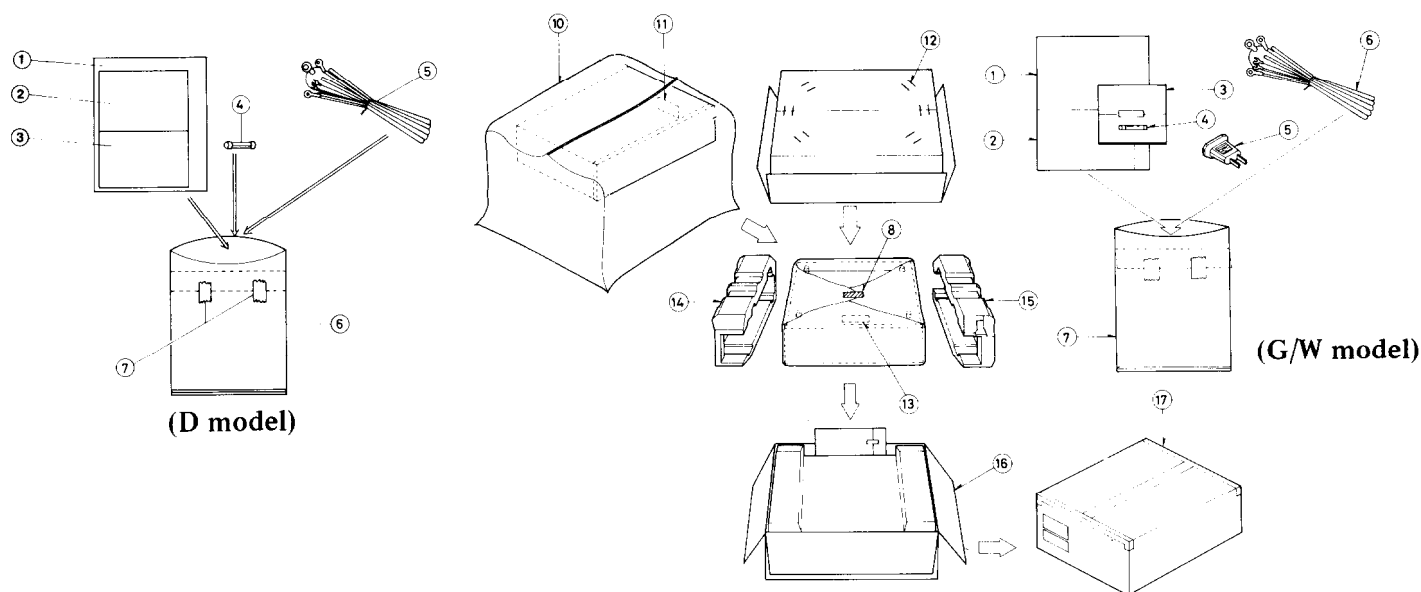
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	210054A	PL6.3V, 0.25A, Pilot lamp

#### NOTES:

- DC voltage are measured with V.T.V.M. to chassis at no signal applied.
- Capacitor LL: Low leakage current type electrolytic capacitor  
ST: Polyetyren film capacitor



## PACKING PROCEDURES



## PACKING PROCEDURES – PARTS LIST

### (D model)

REF. NO.	PARTS NO.	DESCRIPTION
1	29340391	Instruction manual
2	29358002	Service station list (N)
3	29365006	Warranty card (N)
4	252014	4A-T, Fuse
5	292064	FM antenna
6	29100006	Poly bag
7	261504	Tape
8	261504	Tape
10	29100034	850x650mm, Poly bag
11	29360362	Label (N)
12	282301	Sealing hook
13	29360363	Caution label (N)
14	29090477	Pad (R)
15	29090478	Pad (L)
16	29050332	Carton box
17	260012	Tape
	29355045	Sensor tag

(N): Only U.S.A. model

### (W/G model)

REF. NO.	PARTS NO.	DESCRIPTION
1	29340394	Instruction manual
2	29365005-2	Warranty card (V)
3	29100002	Poly bag (W)
4	252014	4A-T, Fuse
5	25055018	CV-K-1, Conversion plug (W)
6	292064	FM antenna
7	29100006	Poly bag
8	261504	Tape
10	29100034	850x650mm, Poly bag
12	282301	Sealing hook
14	29090477	Pad (R)
15	29090478	Pad (L)
16	29050332	Carton box
17	260012	Tape
	29355045	Sensor tag

(V): Only Germany model

(W): Only W model

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Telex: 2423551 ONKYO J. Phone: 03-432-6981

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